

POSIX
Open Systems Project Engineering Conference
(OSPEC)
FY 98 Status Review
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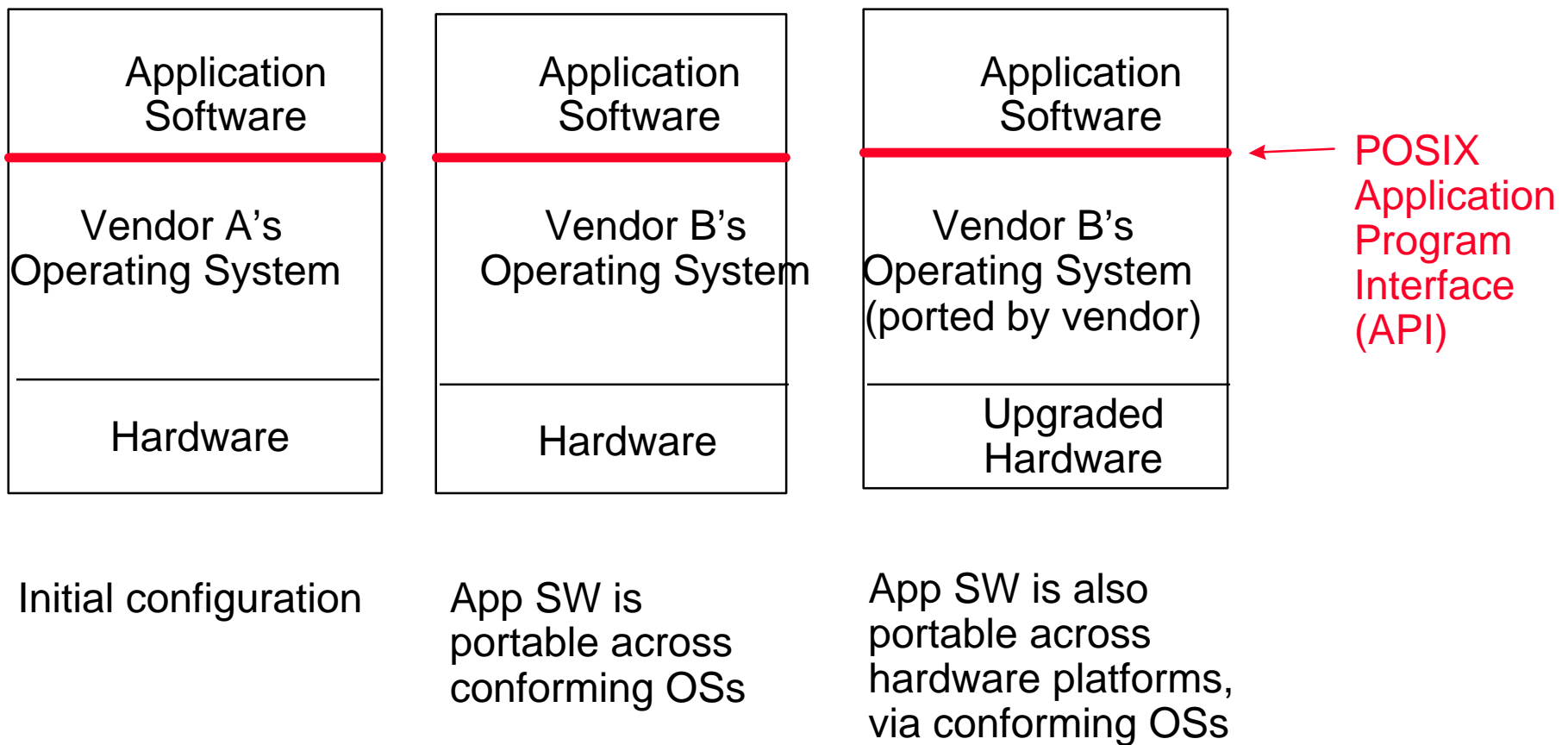
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POSIX: Portable Operating System Interface



- **Family of operating system interface standards developed by the IEEE Portable Applications Standards Committee (PASC)**
- **Due to UNIX heritage, initially limited to:**
 - Centralized
 - Interactive, time-sharing
 - C language
- **Now, due in part to DoD influence, extended to:**
 - Distributed
 - Realtime, fault tolerant
 - Ada language

POSIX Objective: Application Software Portability





POSIX Projects: Goals

- To influence the development of operating system interface standards, so that the standards will better meet the requirements of DoD systems
- To foster the development of COTS operating systems that conform to the standards



POSIX Projects: Payoffs

- **Affordability**
 - Suitable COTS operating systems will be available
- **Supportability**
 - Application software will be portable across operating systems (e.g., from an old vendor's product to a new vendor's product)
- **Upgradeability**
 - Vendors will routinely port their standards-conforming operating systems to new and innovative hardware platforms
- **Risk Reduction**
 - Programmer expertise will be applicable across projects

POSIX Projects: General Approach



- **Identify requirements**
- **Influence standards development through participation in IEEE PASC**
- **Stimulate product development**
 - **Work with users**
 - **Cooperate with vendors**
 - **Formulate and publicize profiles**
 - **Establish conformance testing capabilities**



- **Target application environment: realtime**
- **Target requirements: predictability and high performance**
- **Focus: IEEE PASC participation**
 - Realtime working group
 - Interface standards
 - Profile standards

POSIX Realtime: Key Results



- **Approved IEEE interface standards:**
 - **1003.1b, Realtime Extension**
 - High-resolution clocks and timers, priority scheduling, memory locking, asynchronous I/O, semaphores, shared memory, memory mapped files, message passing, synchronized I/O, realtime signals
 - **1003.1c, Threads Extension**
 - Threads, mutexes, condition variables

POSIX Realtime: Key Results (cont.)



- **Approved IEEE profile standard:**
 - **1003.13, Realtime Application Environment Profiles**
 - Specifies four profiles, ranging from a minimal profile to a general-purpose profile

Minimal
(e.g., for missile)

baseline POSIX

- excess baggage
- + core realtime functionality

Controller
(e.g., for fire control system)

Minimal

- + file system

Dedicated
(e.g., for avionics system)

General-Purpose

- file system

General-Purpose
(e.g., for command and control system)

baseline POSIX

- + all realtime functionality

POSIX Realtime: Key Results (cont.)



- **Draft IEEE standards:**
 - **P1003.1d, Additional Realtime Extensions**
 - New process creation mechanism, new scheduling policy, execution time monitoring, I/O advisory information, timeouts, device control, interrupt control
 -
 - **P1003.1j, Advanced Realtime Extensions**
 - Typed memory, multiprocessor-oriented synchronization primitives, high-resolution delay-until
 - **P1003.1q, Trace**
 - Facilities for recording system and user events

POSIX Realtime: Key Results (cont.)



- **Cooperation with The Open Group (TOG), a consortia of vendors and users formed from the merger of X/Open and OSF**
 - **The Single UNIX Spec Version 2 (SUS V2) includes the POSIX realtime standards 1003.1b and 1003.1c**
 - **DoD participated in the “company review” of SUS V2, contributing 227 out of the 451 of the submitted comments and 173 out of 339 of the accepted comments**
 - **DoD contributed two chapters (POSIX Realtime and POSIX Threads) to *Go Solo 2*, the TOG publication that introduces SUS V2 to the general public**

POSIX Projects: Schedule



- **There is an IEEE PASC-imposed deadline of Dec. 31, 1999, for the realtime projects (P1003.1d, P1003.1j, P1003.1q), as well as for other PASC projects**
- **P1003.1d: Next ballot closes June 30, 1998**
- **P1003.1j: Next ballot closes Aug. 31, 1998**
- **P1003.1q: First ballot closes Sept. 15, 1998**
- **Then, ballot resolution and consensus building begin (75% approval is required)**
- **Up to two or three additional ballots may be conducted prior to the Dec. 31, 1999, deadline**

POSIX Projects: Issues



- **IEEE PASC-imposed deadline of Dec. 31, 1999**
- **Stability of funding for IEEE PASC participation**
- **Standards development is resulting in a proliferation of optional functionality**
- **System engineering (e.g., in the form of profile development) is trailing standards development**
- **Opposition by some “big” vendors to “niche” functionality**
- **Availability of conforming operating systems**

POSIX Projects: Recommendations



- **Apply funding and resources to finish standards by deadline**
- **Continue to address marketplace issues**
 - **Use system engineering principles to organize the many POSIX standards and their optional functionality**
 - **Increase emphasis on profiles**
 - **Provide better guidance to users and procurers, who sometimes ask for POSIX and *all* its options, when a subset of the options would better meet their needs**
 - **Establish better relationships with operating system vendors**
 - **Pursue conformance testing initiatives**